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ABSTRACT

The primary purpose of the study was to develop, test, revise, and publish instructional materials which would aid in the implementations of "The Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12". A major task was the development of illustrative instructional materials which would make the classroom teachers' work more effective and improve Wisconsin's industrial education program. Methods and procedures are treated in chapter 2 and include material development, population selection, and research instrument development. Chapter 3 reports the project results: identifying and implementing prevocational and capstone applications, designing a model and developing related instructional materials, and field testing, revising, publishing, distributing, and utilizing the materials. Appendix materials include abstracts describing 14 guide implementation materials that have been field tested, abstracts describing 14 that were not field tested, and a form for educator's evaluation of the materials developed to implement the guide survey. (MW)

ED 097539

Final Report

Project No. 4-3623/R004

DEVELOPING INSTRUCTIONAL MATERIALS TO AID IN IMPLEMENTING THE WISCONSIN GUIDE TO LOCAL CURRICULUM IMPROVEMENT IN INDUSTRIAL EDUCATION, K-12

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Prepared by

JOHN M. RITZ

Project Directors

Lawrence S. Wright

M. James Bensen

The Graduate College and the Center for Vocational, Technical and Adult Education, both of the University of Wisconsin-Stout
Menomonie, Wisconsin

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CHAPTER I

PROBLEM STUDIED

Summary

The primary purpose of this study was to develop, test, revise, and publish instructional materials which would aid in the implementations of The Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12. This study was an initial step undertaken as a joint project orgainzed at University of Wisconsin-Stout through the cooperation of the Wisconsin Department of Public Instruction; The Graduate College and the Center for Vocational, Technical and Adult Education, both located at Stout.

A staff composed of a project director, assistant director, coordinator, and six graduate assistants was employed to develop illustrative instructional materials which would make the classroom teachers work more effective and at the same time realize an improved industrial education program in Wisconsin schools as a result of using the Guide as a base for these materials.

A total of twenty-three self-instructional learning activity packages, twelve problem solving activities, two suggested course curriculums, and an elementary industrial education unit was developed. Of these, fourteen individualized learning activity packages have been field tested, revised, and published. The field testing was conducted at nine Wisconsin testing centers with a total of fifteen volunteer teachers. All materials were evaluated using an attitudinal measurement instrument designed by the project staff.

Published materials are available through the Wisconsin Department of Public Instruction, Madison.

Statement of the Problem

The purpose of this study is to aid in the implementation of The Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12 by developing illustrative self-instructional materials, have these materials field tested and revised, and publish them for distribution to classroom teachers in the state of Wisconsin.

Research Goals

The project will employ a Coordinator of Industrial Education Instructional Materials Development who will:

1. Identify specific areas in the Guide for implementation including both pre-vocational and capstone applications.
2. Design a model and develop instructional materials in concurrence with the model (possibly self-instructional) for these areas.
3. Field test the materials.
4. Revise the Materials as a result of the field tests.
5. Publish the materials.
6. Distribute them to industrial education teachers in Wisconsin.
7. Supervise such graduate assistants as may be assigned to the project for developing, testing and publishing the materials.
8. Be available as a resource person to teachers and teacher groups in Wisconsin and aid them in their efforts to implement the Guide and to offer demonstration experiences.

Rationale for the Study

Educators are cognizant of the necessity for continuous improvement in educational programs. Industrial education instructors have been particularly concerned with the problem of making industrial education relevant in our modern society.

During the 1960's many innovative industrial educations programs come into existence. These programs were attempts to bring industrial education within the context of modern industry and technology. Until this decade, the instruction in industrial education focused on the study of the occupational families. Since then many more industrial education

programs have been funded and teachers have received instruction in implementing these changes into their curriculums.

In an attempt to improve local industrial education curriculum in the state of Wisconsin, a committee of industrial education teachers have dealt with the problem at the state level. This organized attempt at curriculum improvement was the result of a need as stated by teachers throughout Wisconsin. Many schools have requested a resource to use in the development of local curricula[1] in industrial education.

As the result of these requests, the Wisconsin Department of Public Instruction began a project to aid industrial education teachers in curriculum improvement. Nearly three years of research and revision by the committee members has culminated in the publication entitled, The Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12.

As further stated in the proposal, "Developing Instructional Materials to Aid in Implementing the Guide":

> The Guide was developed as an attempt to improve industrial education programs in the state of Wisconsin. The Guide does establish a base for industrial education programs, but the implementation of the concepts becomes a local matter. With teachers employed to devote their full time to teaching, there is limited time available for creative curriculum work. Improvement in industrial education programs is more likely to be made if example materials which are based on the Guide and which have been field tested are published and made available to classroom teachers in Wisconsin.
>
> Literature on change and the change process suggests that revision will be made when some sort of a reward is perceived by those who will be implementing the change. Monetary rewards are a limited resource, and many teachers cannot be stimulated by "professional ideals". We believe that most teachers can be reached by providing instructional materials that will make their class work more effective and at the same time realize an improved industrial education program in Wisconsin schools as a results of using the Guide as a base for these materials.[2]

The Guide is only a framework for developing curricula.[3] It was not developed as a prescriptive and detailed document.

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[1] Wisconsin Department of Public Instruction, The Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12 (Madison, Wisconsin, 1973), p. iii.

[2] Lawrence S. Wright and others, "A Proposal for Developing Instructional Materials to Aid in Implementing The Wisconsin Guide to Local School Improvement in Industrial Education, K-12, University of Wisconsin-Stout, Menomonie, Wisconsin, 1973, p. 1.

[3] Wisconsin Department of Public Instruction, op. cit., p. 1.

The Guide:

> . . . Attempts to provide meaningful direction and still leave opportunity for creative approaches in meeting the diverse needs of the school population in all grades, K through 12.[4]

If the Guide is to serve its purpose, the classroom teacher will be required to understand how to implement its content into their present programs. Therefore, it is the purpose of this study to provide representative instructional activity packages based on the structure of the Guide. In doing this, we are attempting to create examples to show how the Guide can be used. We are not trying to create on industrial education program that will be used by all Wisconsin Industrial Education teachers, only suggested ideas of how teachers could implement the Guide into their present programs, in expectation of creating a better and stronger industrial education curriculum.

Limitations

The late approval of the 1973-1974 proposal limited the operation of the project. For this reason, most of the material development was oriented toward the middle-junior high school.

Definition of Terms

Following is a list of terms related to the following research. A basic knowledge of these terms will help in understanding this research proposal.

The Guide - The Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12. A curriculum resource that has been developed to assist school districts in planning and structuring their industrial education programs.

Field Objectives - The broad objectives that all Wisconsin Industrial Education programs should strive to meet. These are identified in the Guide as:

To provide students the opportunity:

To work with elements of industry to gain understanding of how they function in producing goods and service.

To understand the interdependence of society and industry.

To explore the content in which industry has developed and continues to develop.

To explore occupational areas as a basis for selecting a career and understanding the pursuits of others.

---

[4] Ibid., p. 3.

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To prepare for entry into appropriate industrially related occupations and develop a base for further occupational education.[5]

Terminal Objective - Final student outcome for a given lesson. These should be developed directly from the field objectives.

Enabling Objectives - Sub-objectives that explain to the student what he will have to do to achieve the terminal objective and become competent in the area.

Elements of Industry - Those parts fundamental to the existence of industry which, when properly coordinated, result in a functioning unit.[6] The Guide categorizes industry into eleven component elements. These are (1) research and development, (2) production, (3) marketing and distribution, (4) maintenance and service, (5) finance, (6) manpower, (7) materials, (8) power and energy, (9) property, (10) management, and (11) communications.[7]

Content Organizers - Those concepts that provide a basis for establishing finer detail within each field objective and element.

---

[5] Ibid.

[6] Ibid.

[7] Ibid.

CHAPTER II

METHODS AND PROCEDURES

Material Development

In an attempt to create useful illustrative instructional materials, a model was designed which was used as the basis for the material development of the project staff. The model was developed directly from the structure presented in the Guide. This structure was transferred into a matrix model that displayed the congruence of the field objectives, industrial elements, and content organizers. The Guide developed in its matrix form may be seen in Figure II-1.

Using the matrix model, the project developed a number of individualized learning activity packages. Most of the materials are student directed activity packages. They are intended to be student directed but can also be easily implemented into a teacher directed group classroom setting. In all, a total of twenty-three individualized learning activity packages were developed. Of these, twenty were intended to be used in the junior or middle high school. The remaining three packages were directed toward the high school or capstone industrial education programs.

Besides the individualized packages, twelve teacher directed problem solving activities, two proposed course curriculums, and an elementary industrial education unit were prepared. In Table II-1 are listed the titles of materials developed by the project staff. The abstracts of these materials are located in Appendices A and B.

Due to the late approval of the 1973-1974 proposal, limited field testing of these materials was undertaken. In the following section, a description of how the population was selected for the field testing is presented.

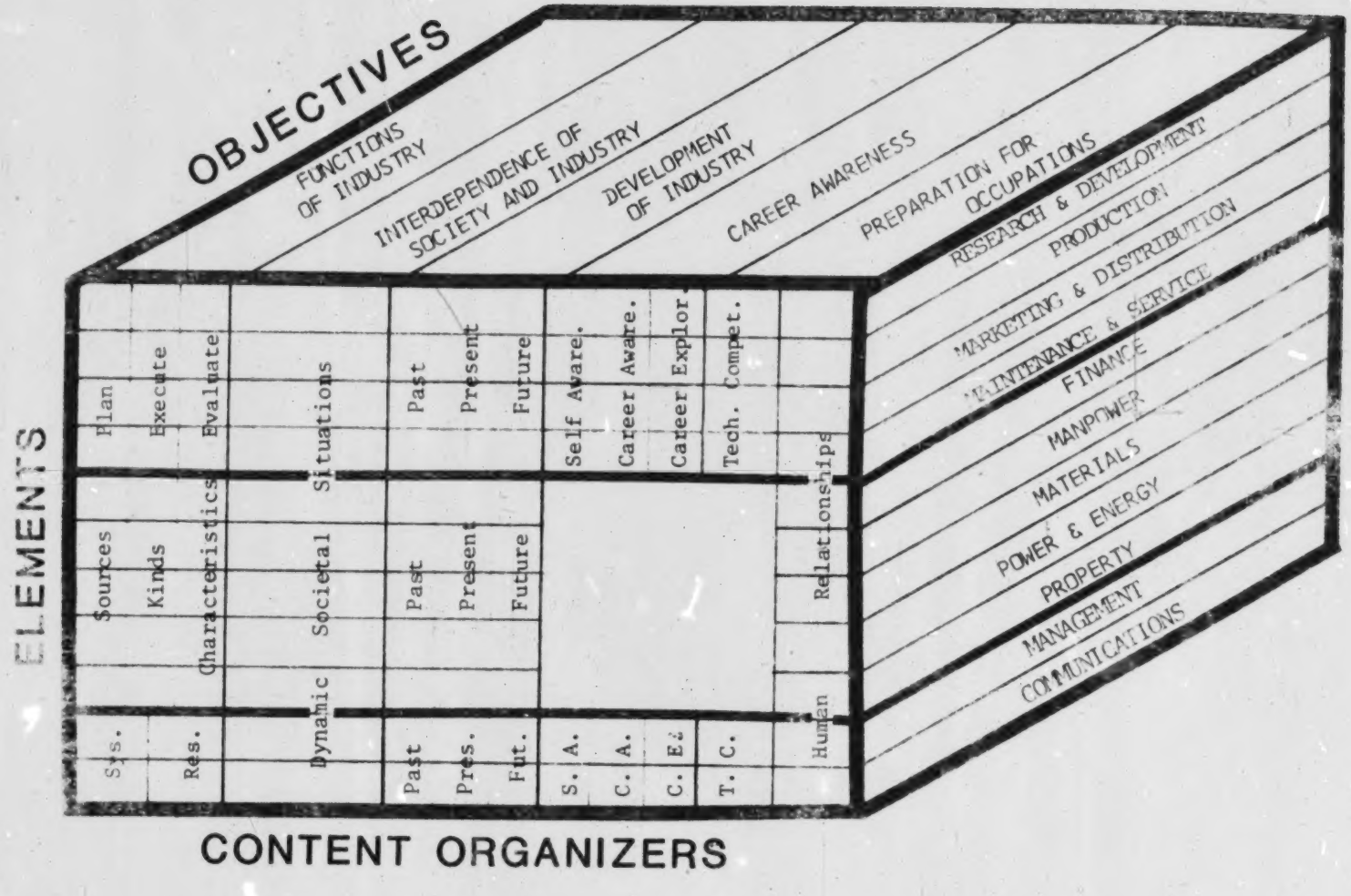
Selecting the Population

The field testing centers for this study were selected upon recommendation of Dr. Lawrence S. Wright, Dr. M. James Bensen, and Mr. Harry B. Olstad, all of the Industrial Teacher Education Department, University of Wisconsin-Stout. After the recommendations were received, letters and a survey form were sent to the teachers at the testing areas, asking for their assistance in testing the instructional materials.

Twenty-five letters were sent to the recommended teachers in the field who would be looking for new ideas to implement into their present industrial education programs. Three of these were sent to area supervisors. They requested that the supervisors recommend additional teachers to participate in our testing.

The project had hoped to involve all who responded to the letter in its field testing. The responses of thirty-nine teachers was better than we expected, and we were unable to use everyone this academic year.

FIGURE II-1



GUIDE MATRIX

TABLE II-1

TITLES OF MATERIALS DEVELOPED

Individualized Packages:

- Overview of Industrial Education
- An Introduction to Research and Development
- Introduction to Production Technology
- The Development of Industry
- An Overview of Marketing and Distribution
- Maintenance and Service
- Let's Study Finance
- Human Resources
- Analyzing a Career
- Getting to Know Materials
- Power and Energy
- What is Property
- What is Communications
- Communications Between Society and Industry
- The Development of Communications
- Occupations in Communications
- How Does Industry Use Management
- How Does Management Affect Industry and Society
- Interviewing for a Job
- The Enterprise
- Introduction to a Capstone Program
- Early Lumbering
- Geometric and Positional Dimensioning

TABLE II-1 cont.

TITLES OF MATERIALS DEVELOPED

Problem Solving Activities

- Let's Make a Kite
- Let's Make a Yo-Yo
- The Electro-Magnetic Crane
- Let's Make a Hand Fishing Reel
- Let's Make a Wall Hanging
- Designing a Mobile
- Let's Build an Elevator
- Let's Construct a Catapult
- Let's Design a Recreational Game
- Repair of a Lamp Cord and Socket
- The Cleaning and Lubrication of Electric Motors
- Lab Maintenance Plan Development

Course Proposals

- The Metals Industries
- Automotive Curriculum
- Elementary Unit

Factors that eliminated many possible testing centers included lack of time, location of testing volunteers, and material reproduction costs. During the original screening of the test centers, the project directed its efforts at locating teachers who were involved in instruction at the junior high and middle school levels. At that time, all of the material development that had taken place was aimed at the middle-junior schools.

Through the screening process, fifteen industrial education teachers were selected at nine Wisconsin schools. The developed individualized instructional materials were then reproduced by spirit duplication and personally delivered and explained to the participating teachers at the testing centers. Along with the instructional packages, implementation instructional sheets, student evaluation tests, and teacher evaluation questionnaires were delivered to the testing centers.

Research Instrument Development

A two-page survey instrument was designed for collection of data from the fifteen field testing instructors. A review of related literature was conducted together with a review of questions relating to the research. The coordinator, with the assistance of the project staff, selected the questions to be used in the "Educator's Evaluation of Materials Developed to Implement the Guide" questionnaire. This survey instrument included fifteen closed-form items and one open-ended question. A sample of the research instrument appears in Appendix C.

The questionnaire or instrument is a series of questions and statements to which the field testing instructor is asked to respond. The instrument used in this study was developed to determine the attitudes of the respondents to which it was administered.

For the purpose of analyzing the data that was gathered, the researcher constructed the questionnaire using the Likert rating scale. The final question on the survey was open-ended. The evaluation teacher was given the opportunity to list any suggestions or recommendations for the revision of the instructional package prior to its final publication.

A number of the field testing participants submitted more than one questionnaire since they did test more than one package. Though a number of survey questions was directed to the package being tested, the majority of the items were appropriate to each of the packets.

Data Analysis

The returned instruments were key punched, processed, and tabulated at the university's computer center. The data generated were used by the researcher for the evaluation of the materials developed.

CHAPTER III

REPORT OF THE FINDINGS

Introduction

The findings presented in this chapter were collected from the work carried out by the project staff at University of Wisconsin-Stout and the "Educator's Evaluation of Materials Developed to Implement the Guide" received from the field testing centers. The format used in this chapter is based on the objectives of the project. The results are presented under each project objective.

Project Results

1. Identify specific areas in the Guide for implementation including both pre-vocational and capstone applications.

After the coordinator was employed, a conference was arranged with the project's director and assistant director. At that time the guidelines for the project were established. The project's director was a member of the committee who developed the Guide. With this insight, the knowledge of what was needed to make the implementation of the Guide a reality was at hand. Using this knowledge as a point of departure, the coordinator developed an organization chart to represent the range of material to be developed by the project.

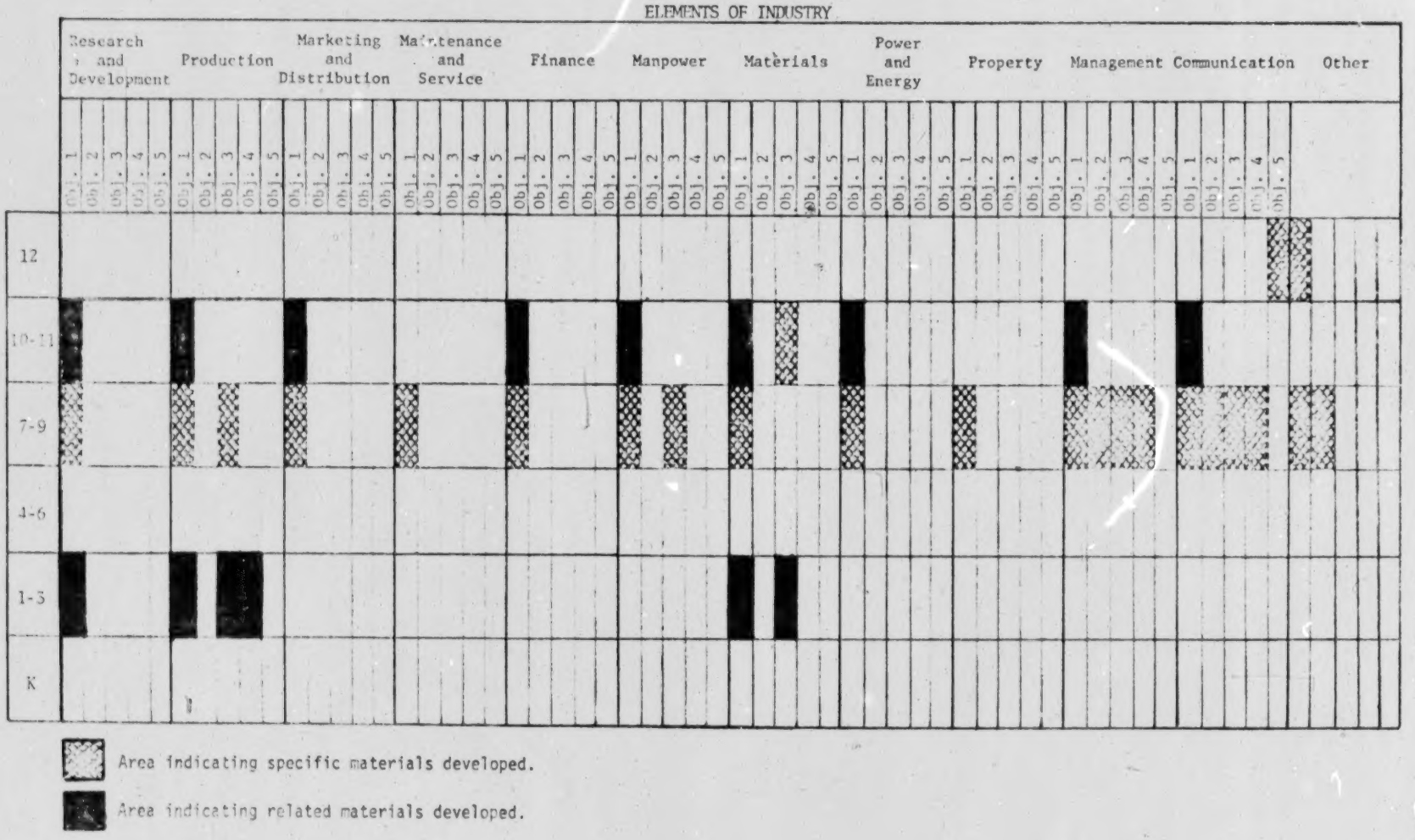
This chart was broken into grade levels, elements of industry, and Guide objectives. It may be seen in Figure III-1. The grade levels that are indicated on the chart were decided upon by the coordinator and graduate assistants. It was felt that different experiences in industrial education should be provided at various grade levels. It was also felt that the student would be physically developed to encounter different levels of skills according to these break-downs.

The other dimension of the chart included the elements of industry and field objectives from the Guide. All eleven elements of industry were listed with the five field objectives below each element. In addition, an area labeled "other" was included on the chart. This area was provided for those materials that did not fit exactly under the elements of industry but are an important segment of industrial education.

As the table shows, many of the materials developed were for the middle-junior high school as a result of a decision made by the coordinator. Since students are required to enroll in industrial education classes at many Wisconsin schools during the middle-junior high years, it was felt that example instructional materials provided for this age group would be most helpful to the classroom teachers.

FIGURE III-1

GUIDE IMPLEMENTATION AREAS



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After a number of examples were provided for the middle-junior high level, the project staff began to develop instructional aids for other grade levels.

As is represented by Figure III-1, the number of instructional aids that can be developed to implement the Guide is limitless. It was the intention of the project to provide examples of how all the elements of industry could be implemented by the classroom teacher. In addition, the material development was also aimed at representing how all the objectives of the Guide can be implemented into an industrial education curriculum.

Though a number of the developed materials are aimed specifically at one industrial element and one field objective, others were developed to tie a number of elements and objectives into one learning experience. This was accomplished through the problem solving activity materials and the elementary unit.

2. Design a model and develop instructional materials in concurrence with the model (possible self-instructional) for these areas.

After the Guide Matrix Model and Guide Implementation Areas chart were designed, a model was needed so that the project staff could begin to develop materials that would be useful to the classroom teacher.

The coordinator designed a flow diagram model which was used in developing all the materials produced by the project staff. Besides being used by the project staff, the model can be easily followed by classroom teachers to aid in the development of their own implementation materials. The model appears in Figure III-2. Figure III-3 is a supplement to Figure III-2. It provides additional assistance for the development of terminal and sub-objectives which follow the structure of the Guide.

In addition to the model, the coordinator developed an outline to provide uniformity in all materials developed by the project staff. This was done so that students would not have to learn to use varying styles of packages. All individualized packages were prepared using the same format. Using the model for material development, the project staff produced twenty-three individualized learning activity packages. The majority of these packages were for the middle or junior high school. In addition, twelve problem solving activities and an elementary industrial education unit were prepared. Abstracts of all materials are found in Appendices A and B.

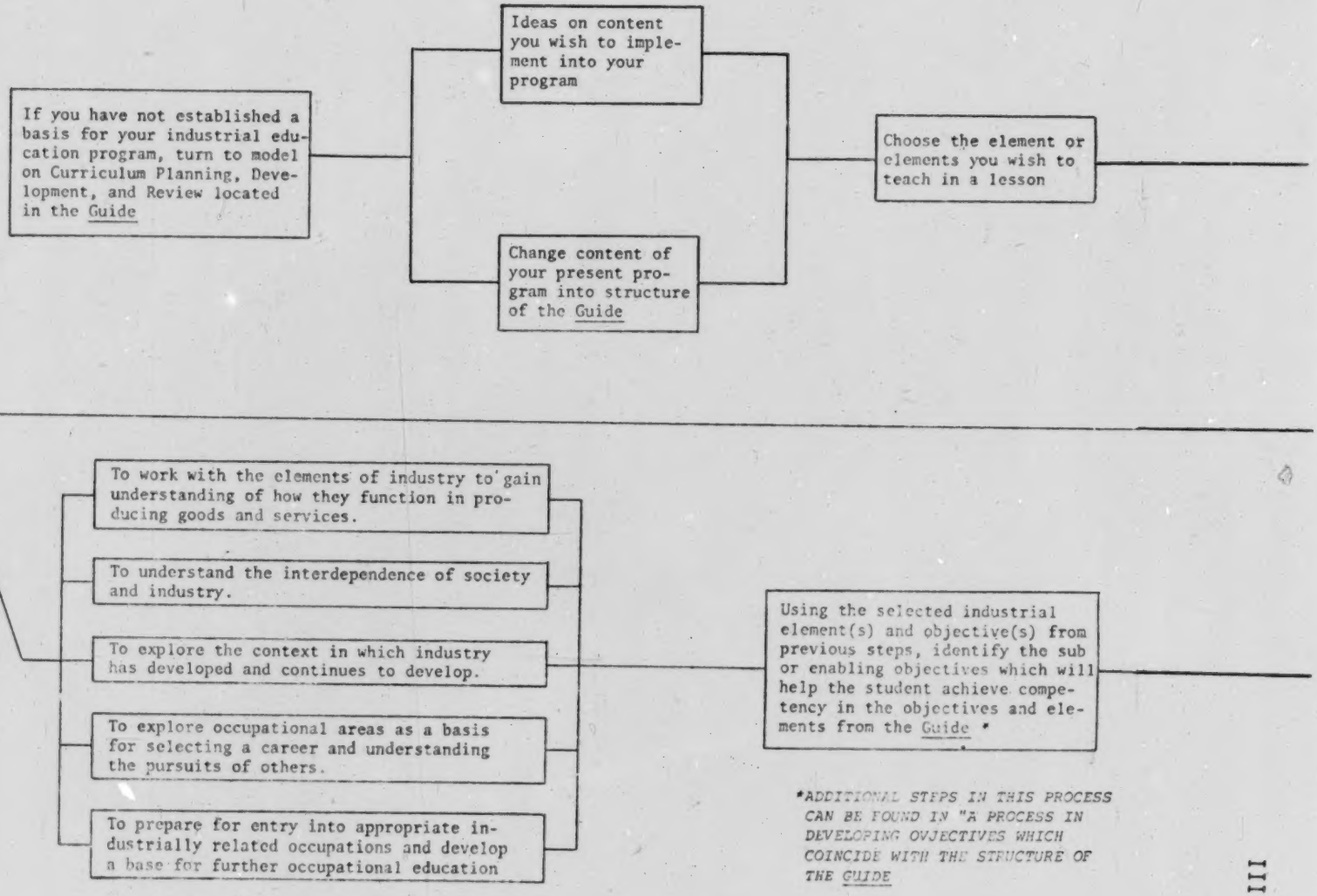
In addition to developing instructional materials, the coordinator also reviewed the AVA materials developed at Wayne State University. A synopsis of these aids was composed displaying how they contained the content provided for in the Guide and are available in the project office.

3. Field test the materials.

After a number of instructional materials were developed, the coordinator arranged to have these field tested by Wisconsin industrial education teachers. At the time of the field testing evaluation, eighteen individualized learning activity packages were ready for testing. These materials were

FIGURE III-2

A PROCESS TO IMPLEMENT THE GUIDE


If you have not established a basis for your industrial education program, turn to model on Curriculum Planning, Development, and Review located in the Guide
Ideas on content you wish to implement into your program
Change content of your present program into structure of the Guide
Choose the element or elements you wish to teach in a lesson
To work with the elements of industry to gain understanding of how they function in producing goods and services.
To understand the interdependence of society and industry.
To explore the context in which industry has developed and continues to develop.
To explore occupational areas as a basis for selecting a career and understanding the pursuits of others.
To prepare for entry into appropriate industrially related occupations and develop a base for further occupational education
Using the selected industrial element(s) and objective(s) from previous steps, identify the sub or enabling objectives which will help the student achieve competency in the objectives and elements from the Guide *

ADDITIONAL STEPS IN THIS PROCESS CAN BE FOUND IN "A PROCESS IN DEVELOPING OVJECTIVES WHICH COINCIDE WITH THE STRUCTURE OF THE GUIDE

FIGURE III-2 cont.

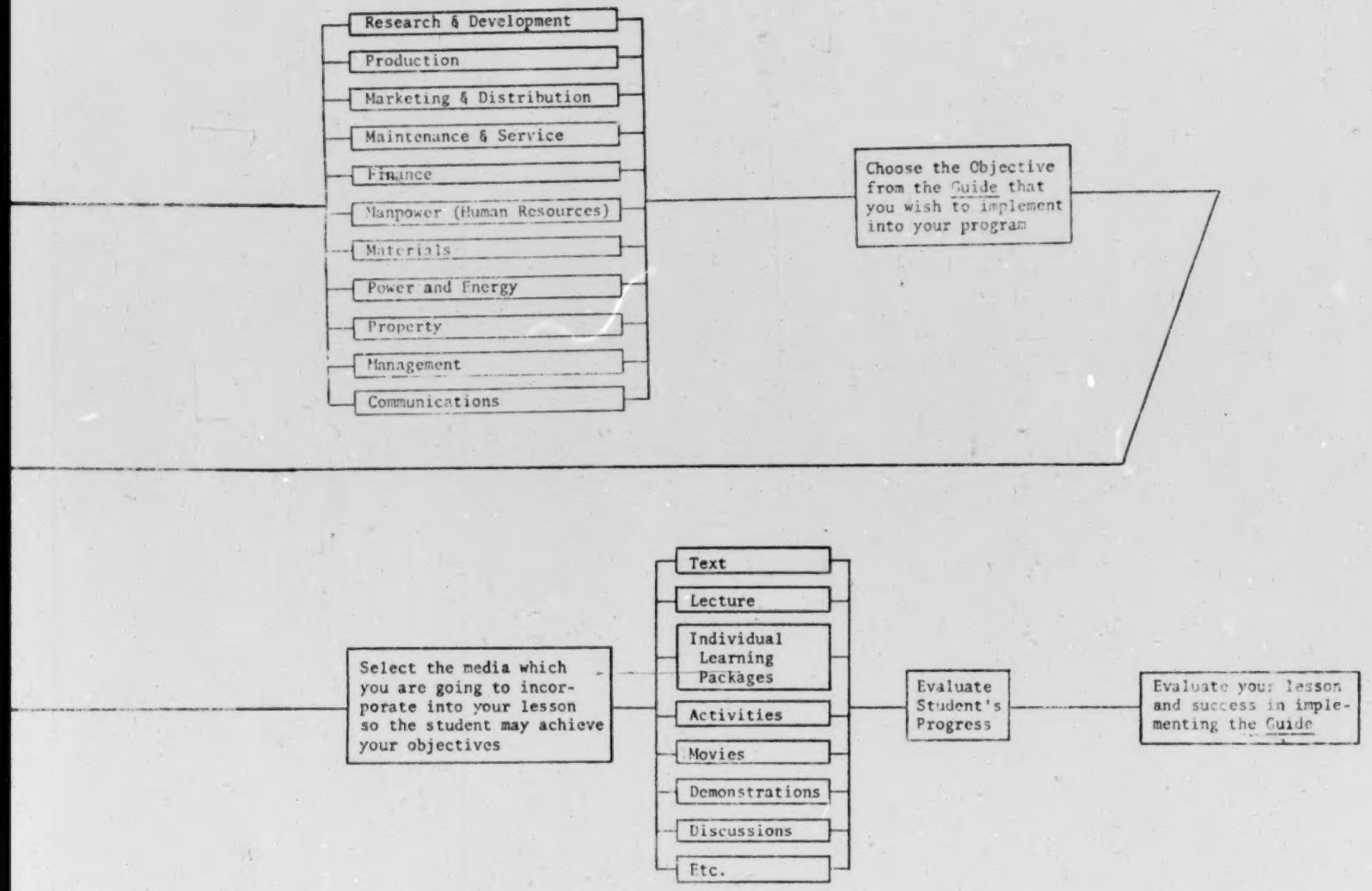


FIGURE III-3

A PROCESS IN DEVELOPING OBJECTIVES WHICH COINCIDE WITH THE STRUCTURE OF THE GUIDE

Suppose that you chose to implement the Materials element into your present industrial education program. You also wish to incorporate Field Objective One from the Guide (To work with the elements of industry to gain understanding of how they function in producing goods and services) in teaching the Materials element.

Develop the terminal objective or final student outcome of teaching this lesson. In this case Materials will be combined with Field Objective One from the Guide, e.g., "To work with the Materials element of industry to gain an understanding of how it functions in producing goods and services."

From the terminal objective should be developed the sub or enabling objectives. These should explain what the student will have to do to achieve the terminal objective and become competent in the area.

The enabling objectives should relate directly to the terminal objective, which in turn should relate back to the Field Objective from the Guide. If this happens, you will be teaching content which is based on the goals of the Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12.

In developing the enabling objectives, refer to the structure of the Guide. In this case, refer to the model dealing with Field Objective One.

Using the model, identify the element that you are going to implement into your program. Next locate the Content Organizers which are listed across the model. For the materials element the Content Organizers are Sources, Kinds, and Characteristics.

Using this information (Field Objective, Element, and Content Organizers), the following enabling objectives were developed for our previous developed Materials terminal objective:

(1) You will define, in your own words, materials as they relate to industry. (This was developed since the student must understand what materials are in order to study about them in any more depth.)
(2) You will list the four general sources of materials. (Content Organizer "Sources").
(3) You will identify at least seven different kinds of classes of materials. (Content Organizer "Kinds").
(4) You will name and define the characteristics of properties of materials that are considered by industry before a material is selected for a product. (Content Organizer "Characteristics").

If you have followed these suggestions and if you teach the content listed in your enabling objectives, your students will be receiving instruction following the guidelines set-forth in the Guide.

Refer back to step eight of "A Process To Implement The Guide." Now you must locate or develop the media required to teach the content of your enabling or sub objectives.

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As they were delivered to the selected field testing centers, each package was accompanied with an evaluation survey form. The following section deals specifically with the data gathered from the field testing. The results of the field testing surveys were used in the revision of the instructional materials.

From those teachers who volunteered to participate in the field testing, a total of twenty-four survey questionnaires were returned from ten testing center instructors. Five instructors failed to return any of the evaluation questionnaires. Of those twenty-four opinionnaires received, each was based on only one of the fourteen instructional packages. Many of the volunteer teachers tested more than one package. In addition, many packages were tested by a number of different teachers.

When the twenty-four questionnaires were received each was coded and processed into the computer using a teletype relay machine. This was done so that a computer could be used to assist in the statistical tabulation of the responses. The collected data were processed using the Weighted Score Analysis Program. This program was used to treat the data, because it provides the following information which is essential when determining attitudes: the median response of the subjects, the interquartile range, and the frequency distribution.

The median is that point on the attitude scale of measurement above which are exactly half the responses and below which are the other half of the responses. This locates a point around which the majority of subjects responded. The IQR or interquartile range is also used when studying attitudes. It specifies the range or distance within which the middle 50 percent of the responses fall.

After the data were collected and processed, the statistical tabulations for the medians and IQR's of each item were examined. This information provided evidence that certain attitudes prevailed among the field testing teachers concerning the developed instructional materials. Since the researcher intended to uncover these attitudes and the statistical data provided such information, it is concluded that this study was valid. The reliability coefficient for the processed data was examined. The overall responses measured a .83 test reliability coefficient. A reliability coefficient of +.80 or better is commonly accepted as a high level for an educational study. Consequently the evaluation survey proved to be consistent and would tend to measure the approximate same scores of the same individuals if administered at a later time.

After the data were processed, an overall response toward each statement was gathered from the respondents. This information was then transferred into tables so it could be examined and understood more readily. The fifteen statements from the questionnaire were treated in the same manner. Five statements were handled on each table.

The following information section will deal with the highlights of the study as displayed by the tables. Only those statements displaying

significant attitudes will be discussed. To determine the significant attitudes, the IQR was used as the basis. For this study, those statements which displayed an IQR of 1.50 or lower will be considered.

Observing Table III-1, shows that four statements display significant attitudes. These were revealed by the relatively low IQR's in items one, two, three, and four. Item one states: The student will frequently use the technical knowledge and skills he has developed while studying this lesson. It revealed an attitude of "agreement" as is evidenced by the median score of 2.19.

The package provided sufficient activities for the student was the second item that showed a significant response. The subjects "agreed" to the item by showing a median score of 2.12.

The third item to display a significant response is the statement: Student interaction was provided for through the use of this package. To this item, the respondents "agreed" showing at 2.00 median score.

A response of "agree" was also registered for statement four of the survey. Here the field testing instructors display a median measurement of 2.17 to the statement: The package provided a realistic approach for the student to obtain education for a future position in our society.

Moving to Table III-2, it can be observed that two statements provide significant information relating to the tested instructional materials. This is evidenced by the low IQR's for items six and ten.

Item six states: Content provided in this package was usually up-to-date. This item did reveal a significant response by the low interquartile range, 0.67. The subjects did "agree" to the statement as is shown by the 1.83 median.

Statement ten (All junior high students should be required to study the materials presented in this package) measured a positive response. The field testing teachers "agreement" was shown by a median score of 1.90.

Finally, proceeding to Table III-3, we see that three additional significant statements are listed. These are for items eleven, thirteen, and fifteen. Item eleven recieved a response of 4.79 or strong disagreement. The subjects "strongly disagreed" to the statement: This package has no place in the curriculum of my industrial education program.

Item thirteen (Other industrial education technical instruction would have been more relevant to the needs of the majority of my students), reveals a response of "disagreement". The median score of 3.85 shows this.

The final significant response shown in the study is to item fifteen. It states: The package contributes effectively toward understanding, by

TABLE III-1

EVALUATION OF FIELD TESTED MATERIALS

QUESTIONS 1 THRU 5

Item No.	Item	Median	IQR
1.	The student will frequently use the technical knowledge and skills he has developed while studying this lesson.	2.19	1.44
2.	The package provided sufficient activities for the student.	2.12	0.75
3.	Student interaction was provided for through the use of this package.	2.00	0.75
4.	The package provided a realistic approach for the student to obtain education for a future position in our society.	2.17	1.50
5.	Instruction provided in this material was always related to achievement of my course objectives.	2.08	1.92

TABLE III-2

EVALUATION OF FIELD TESTED MATERIALS

QUESTIONS 6 THRU 10

Item No.	Item	Median	IQR
6.	Content provided in this package was usually up-to-date.	1.83	0.67
7.	Instruction in this package was usually geared toward the individual and his needs, rather than the class as a whole.	2.17	2.00
8.	The instructional material covered a wide enough spectrum to meet the educational needs of all my students.	2.38	2.08
9.	Content of this package was never duplicative of materials previously learned by the student at lower levels of education.	2.38	2.02
10.	All junior high students should be required to study the materials presented in this package.	1.90	1.25

TABLE III-3

EVALUATION OF FIELD TESTED MATERIALS

QUESTIONS 11 THRU 15

Item No.	Item	Median	IQR
11.	This package has no place in the curriculum of my industrial education program.	4.79	0.81
12.	The teaching of this package did not require me to develop any additional skills and strategies.	3.70	1.85
13.	Other industrial education technical instruction would have been more relevant to the needs of the majority of my students.	3.85	0.71
14.	The package provided an excellent source for my students to explore career possibility.	2.57	1.77
15.	The package contributes effectively toward understanding by my students of the concept of how industry functions in producing goods and services.	2.04	0.82

my students, of the concept of how industry functions in producing goods and services. This statement shows an "agreement" response by displaying a 2.04 median measurement.

As is shown by the data collected in the study, the testing teachers did agree to all positive items and disagree to the negative statements on the survey. From this, it is concluded that the materials did prove to be of value to the testing instructors. Through conversation with the testing teachers, it is also agreed upon that the materials were useful in implementing the content of the Guide.

Table III-4 lists the weighted rating of scores of the teachers who tested particular packages. As can be seen, most packages received relatively close weighted ratings. Few scores varied more than ten points in weighted rating of scores. The package with the greatest variance on weighted rating scores was "Overview of Industrial Education". This happened because an instructor tested the materials in a class composed of 11th and 12th grade students. The students felt the package was irrelevant at this grade level, and the teacher rated it in this manner.

After the field testing "Educator's Evaluation of Materials Developed to Implement the Guide" were processed, the comments listed to the open-ended question were used in the revision of the materials. This will be presented in the following section.

4. Revise the materials as a result of the field tests.

During the development of the instructional material designed to aid in implementing the Guide, several steps of revision were undertaken. As the writer finished composing the original draft of his materials, he was required to proof read and add corrections where needed in the materials. After this revision, the instructional aid was routed to the project coordinator. Here the information was proofed for content, explanation, activity, and sentence structure. If additional corrections were required, the material would be returned to the writer so additional revision could be added. If correction did not need to be made, the material was directed to the project secretary for typing and illustration.

After typing, the package was returned to the coordinator for additional proof reading before proceeding to the project directors. After proof reading and listing comments, the packages were again revised by the coordinator. When a package had proceeded through these steps it was approved for field testing. At that time the materials were reproduced using the ditto method of reproduction.

The reproduced materials were given to the testing centers along with an evaluation questionnaire. From comments listed on the questionnaires and information gathered from telephone conversations, the materials were again revised, where needed, by the project staff. After this revision the materials were in proper order to be published and distributed to the classroom teachers in Wisconsin.

TABLE III-4

WEIGHTED RATINGS OF FIELD TESTED MATERIALS

Titles	Weighted Rating
The Development of Industry	44-33
Introduction to Production Technology	36-46
Let's Study Finance	35-39
Overview of Industrial Education	29-55
Analyzing a Career	23-20
Getting to Know Materials	31-33-32
What is Communications	35-29
Occupations in Communications	33-43
Communications Between Society and Industry	39-37
Marketing and Distribution	32
Research and Development	30
How Does Industry Use Management	37
Interviewing for a Job	19
Maintenance and Service	32

* Mean Score 34.3

5. Publish the materials.

When the instructional materials proposed as aids in implementing the Guide were field tested and revised, they were reproduced by offset lithography at University of Wisconsin-Stout Duplicating Center. The instructional materials were reproduced on 8 1/2" x 11" white bond paper using black ink. This method of reproduction was employed to enable the classroom teacher to reproduce as many copies of the original as needed using the thermofax ditto process.

The project reproduced one hundred copies of each of the fourteen packaged instructional materials field tested and revised by the staff. Fifty of each of these packages will be sent to the DPI at Madison. The originals of all developed materials will be housed at University of Wisconsin-Stout under the direction of the project director.

6. Distribute them to industrial education teachers in Wisconsin.

Due to the late approval of the 1973-1974 proposal, the production and testing of the instructional aids was not completed until late May. During May and June the project staff revised those materials that had been field tested. When the materials were returned from Stout's Duplication Center, this phase of the project dealing with publishing was completed.

Those materials that have been published are to be stored at DPI in Madison. It is expected that abstracts of the published materials will be made available to industrial education teachers in Wisconsin. After reviewing the abstracts of developed materials, teachers in the field will be able to indicate what materials they would like to have provided by DPI.

7. Supervise such graduate assistants as may be assigned to the project for developing, testing and publishing the materials.

A total of six graduate assistants were assigned to the project from January through June 1974. Not all graduate assistants worked during the same time period or number of hours. The majority of the assistant's time was concentrated in the writing of instructional materials.

The coordinator held weekly meetings with the graduate assistants as a group. The purposes of the meetings were to present available information and guidance concerning the project. Form sheets and outlines were distributed to them in order that all developed materials would be consistent.

Whenever an assistant selected an area for material development, it would be discussed with the coordinator. In addition, all drafted materials were reviewed and constructive comments listed.

Weekly, the coordinator and graduate assistants held "brainstorming" sessions to gather new ideas to implement student activities. These sessions

proved to be successful as can be seen in the activities contained in the developed materials.

8. Be available as a resource person to teachers and teacher groups in Wisconsin and aid them in their efforts to implement the Guide and to offer demonstration experiences.

Throughout the duration of the project, the project staff has been available as a resource to teachers in Wisconsin. During the field testing experience, the coordinator traveled to the nine testing centers and explained the Guide and instructional materials to the testing instructors.

In addition, the coordinator presented the Guide and developed materials to a group of teachers from Baton Rouge, Louisiana and Brookfield, Wisconsin.

CHAPTER IV

RECOMMENDATIONS

Based on the results, observations, and conclusions in this study, the researcher submits the following recommendations.

1. The data collected and reported in this report should be available for use by persons interested in implementing The Wisconsin Guide To Local Curriculum Improvement in Industrial Education, K-12.

2. It is recommended that the project be again funded for the 1974-1975 academic year. If this occurs, three significant steps should be initiated. These include:

   A. The continuation of identifying areas in the Guide, including the capstone level, where additional efforts should be exerted for implementation.

   B. Additional field testing of those materials developed and those that will be developed if the project is extended. It is felt that all instruction materials should be tested in at least five field testing centers.

   C. The development of a means to distribute abstracts of those materials that have been published. This will enable Wisconsin industrial education teachers to have an insight of those materials available to them.

REFERENCES

Wisconsin Department of Public Instruction. The Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12 (Fall 1973). Madison: Wisconsin Department of Public Instruction, 1973.

Wright, Lawrence S., and others. "A Proposal for Developing Instructional Materials to Aid in Implementing The Wisconsin Guide to Local School Improvement in Industrial Education, K-12." Menomonie: University of Wisconsin-Stout, April 26, 1973.

APPENDICES

Appendix A - Abstracts for Guide Implementation Materials that have been Field Tested.

Appendix B - Abstracts for Guide Implementation Materials that have not been Field Tested.

Appendix C - Educator's Evaluation of Materials Developed to Implement the Guide Survey.

Appendix D - Field Testing Inquiry Letter.

APPENDIX A

Abstracts for Guide Implementation Materials that have been Field Tested

ABSTRACTS FOR GUIDE IMPLEMENTATION MATERIALS THAT HAVE BEEN FIELD TESTED

OVERVIEW OF INDUSTRIAL EDUCATION

ABSTRACT: This instructional package is intended to present the student with an overview of industrial education. Included in this instructional package are definitions of the terms, industry, technology, industrial education, and industrial arts education. In addition this package includes a list of the eleven elements of industry to include: research and development, production, marketing and distribution, maintenance and services, finance, manpower, materials, power and energy, property, management, and communications. An explanation of the function of each element in the total process of providing goods and services is also provided. Graphical representations of how industry relates to society and education are included to aid the student in developing a model representing their thoughts of how industry relates to society and education.

AN INTRODUCTION TO RESEARCH AND DEVELOPMENT

ABSTRACT: This instructional package is intended to present the student with an introduction to research and development as it is used by industry. Included in this lesson is a working definition of research and development. The five steps of the scientific method of research and development are listed and explained along with six traits of a creative thinker. The package explains the role of research and development as used by industry to produce goods and services.

INTRODUCTION TO PRODUCTION TECHNOLOGY

ABSTRACT: The intent of this instructional package is to acquaint the student with the methods and processes used in the production of goods. This package contains a definition of production technology and an explanation of the five stages of production. Also contained in this lesson are descriptions of the production practices of pre-processing, processing, and post-processing.

THE DEVELOPMENT OF INDUSTRY

ABSTRACT: This instructional package is intended to develop within the student an understanding of the significant time periods and major events in the history of industry. Included in this package are the five periods of the development of industry and examples of major events in each period. These are listed to familiarize the student with the history of industry. The student will select one period in history and construct a model of his choice that will explain an event, duplicate a machine, experiment, or a discovery of that time period.

AN OVERVIEW OF MARKETING AND DISTRIBUTION

ABSTRACT: The intent of this instructional package is to familiarize the student with the Marketing and Distribution element of industry and its function in the production of goods and services. This package deals with the product from the time it leaves the manufacturer until it reaches the consumer, including analysis (market research), advertising, transportation, storage, and sales.

MAINTENANCE AND SERVICES

ABSTRACT: This instructional package is intended to acquaint the student with the elements of maintenance and services as they function in modern industry. Included in this package is the definition of maintenance and service as it relates to industry. The package explains the difference between product maintenance and plant maintenance. The significant functions of, and reasons for, plant maintenance are also discussed in this package.

GETTING TO KNOW MATERIALS

ABSTRACT: The intent of this package is to acquaint the student with materials used by industry for the production of goods and services. This package deals with the origin of materials to include, natural and man-made. The lesson also deals with the process industry uses when selecting a material to be used in producing goods. This process includes the consideration of the composition of materials, how the material is processed, where it is available, what it costs, what it looks like, and whether or not it will do the job it is suppose to do.

LET'S STUDY FINANCE

ABSTRACT: The intent of this instructional package is to acquaint the student with the element of finance and its function in producing goods and services. Included in the package is a list of possible sources of financial support available to industry. An explanation of the kinds of financial support to include, stocks, bonds, loans, subsidies and grants, is also included in this lesson. A list of characteristics to be examined before acquiring various kinds of financial aid is included. The characteristics examined are concerned with the do's and don'ts in borrowing money. The proper method of recording financial transactions using a general journal form is discussed along with an explanation of how the stock market functions in the production of goods.

ANALYZING A CAREER

ABSTRACT: The intent of this instructional package is to acquaint the student with a method of career analysis to enable him to determine if a career is in harmony with his future employment goals. A case study of a selected career is included in this package as one example of a method for career analysis.

WHAT IS COMMUNICATIONS

ABSTRACT: The intent of this instructional package is to acquaint the student with the element of communications and how it functions in the production of goods and services. A definition of communications and the importance of accurate communications is stressed in this package. Also included in this lesson is an explanation of why it is so important for industry to coordinate communications of man to man, man to machine, machine to man, and machine to machine.

COMMUNICATIONS BETWEEN SOCIETY AND INDUSTRY

ABSTRACT: The intent of this instructional package is to acquaint the student with the interdependence of society and industry as related to the area of communications. Included in this package are examples of communication methods used by society and industry to communicate and examples of society and industry failing to communicate. Recommendations of how industry and society could improve their communications in a community area is included.

OCCUPATIONS IN COMMUNICATIONS

ABSTRACT: The intent of this instructional package is to encourage the student to explore occupational areas as a basis for selecting a career. A sample outline that will serve as an aid to the student to analyze possible communication related employment opportunities is included. This outline is based on the information provided in the Dictionary of Occupational Titles.

HOW DOES INDUSTRY USE MANAGEMENT

ABSTRACT: The intent of this instructional package is to acquaint the student with the element of management as it functions in the production of goods and services. Included in this package is a definition of management, the six phases of management needed in the production of goods and services, an example of an organizational outline for industrial management, the three basic types of ownership that exist in industry and an explanation of the "decide" process of problem solving.

INTERVIEWING FOR A JOB

ABSTRACT: The intent of this instructional package is to provide the student with an overview of the management element of industry and how it relates to the duties of a shop foreman. A major portion of this lesson deals with procedures used in interviewing candidates for shop maintenance related jobs. In addition the package furnishes a definition of management, and an example of an organizational outline of the responsibilities of the personnel within the shop setting.

APPENDIX B

Abstracts for Guide Implementation Materials that have not been Field Tested

ABSTRACTS FOR GUIDE IMPLEMENTATION

MATERIALS THAT HAVE NOT BEEN FIELD TESTED

THE ENTERPRISE

ABSTRACT: The intent of this instructional package is to acquaint the student with the elements of an enterprise and to gain an understanding of how they function in the production of goods and services. Included in this package is an explanation of the distinguishing characteristics of an enterprise and an industry. An explanation of the eleven elements basic to the existence of an enterprise constitutes a major portion of this lesson. The elements explained are: communications, management, finance, human resources, power and energy, materials, research and development, production, marketing and distribution, property, and maintenance and service.

HUMAN RESOURCES

ABSTRACT: The intent of this instructional package is to provide the student with the opportunity to work with the element of human resources (manpower) to gain an understanding of how it functions in providing goods and services. Included in this package is a definition and three sources of human resources to include: employment agencies, apprenticeship programs, and high and vocational schools. The characteristics of human resources including life styles expectations, duration of employment, commitment to the job, and the extent of responsibility of the job are also discussed in this lesson.

WHAT IS PROPERTY

ABSTRACT: The intent of this instructional package is to aid the student in gaining an understanding of the property element of industry and how it functions in the production of goods and services. Included in this package are the definition and explanation of property including its possible sources: purchased property, inherited property, and granted property. An explanation of real and intangible kinds of property to include land, buildings, equipment, materials, various forms of capital, and patents and rights are a major part of this lesson.

POWER AND ENERGY

ABSTRACT: The intent of this instructional package is to acquaint the student with the element of power and energy and how it functions in the production of goods and services. Included in this package is an explanation of power and energy and their distinguishing characteristics. Five different kinds of energy are discussed to include, natural energy, heat energy, chemical energy, mechanical energy, and atomic energy. Sources of energy supply to include: exhaustible supplies, inexhaustible supplies, and continuous supplies are also explained in the lesson.

HOW DOES MANAGEMENT AFFECT SOCIETY AND INDUSTRY

ABSTRACT: The intent of this instructional package is to aid the student in understanding the interdependence of society and industry as related to the management element. Included in this package are examples of societal management that exist in average communities: examples of societal situations where society and management coordinate their managerial actions, and a sample letter of application for a particular job from a list of employment descriptions.

THE DEVELOPMENT OF COMMUNICATIONS

ABSTRACT: The intent of this instructional package is to encourage the student to explore the context in which the communciations industry has developed and continues to develop. Included in this lesson are explanations of the seven eras of development of the communications industry. These seven eras include: the way communications began, messages of early times, stones to books, early American communications, and early, recent and present and future inventions. The student will construct replicas of early communication methods as aids to gaining an understanding of the important developments in the communication industry. These replicas are assembled into a museum to display the developments in the field of communications.

EARLY LUMBERING

ABSTRACT: The intent of this instruction package is to encourage the student to explore the context in which the industry of early lumbering has developed. This lesson provides factual information that describes the story of how lumber was processed during the 1840's. Included are the tools and terms related to this past industrial era.

INTRODUCTION TO A CAPSTONE PROGRAM

ABSTRACT: The intent of this instructional package is to acquaint the students with the Trade and Industrial capstone program. Included in this package is an explanation of a capstone course and its ultimate objectives. An example of a job cluster and a method of analyzing common competencies of a job cluster are listed. In addition, this lesson provides examples of the seven job clusters in the Trade and Industrial capstone program. These seven clusters are vocational drafting, vocational graphics, vocational woodworking, vocational electricity and electronics, vocational metals, vocational power mechanics, and vocational aero space.

GEOMETRIC AND POSITIONAL DIMENSIONING

ABSTRACT: The intent of this instructional package is to acquaint the student with the geometric and positional dimensioning system to enable him to apply its principles to his future drafting communications studies. Included in this package are definitions, explanations, and symbols used in the geometric and positional dimensioning system. This instructional package is intended to be used in a capstone program and when completed, should guide the student to becoming a more competent draftsman.

PROPOSED CURRICULUM FOR A COURSE IN THE METAL INDUSTRIES

ABSTRACT: This course on Metals Industries is intended to give junior high students a comprehensive overview of the materials, processes, structure and social implications of the metal-oriented industries.

Experiences include laboratory work with testing and processing metals; field trips; small group investigation and reports; and a class enterprise project involving the design, production and marketing of a saleable metal product.

A significant feature of this course is field trips to local industries. The same industries can be visited several times but with a different facet of industry emphasized on each trip, in order to allow the students to become familiar with industry from several points of view. Opportunities for individual study are also provided in the course.

PROPOSED CURRICULUM FOR A COURSE IN AUTOMOTIVE SUSPENSION, STEERING, AND BRAKING SYSTEMS

ABSTRACT: This course of study is intended as an example of how the structure of the Guide can be implemented into a capstone automotive suspension, steering and braking systems program. It deals primarily with objective five of the Guide, "to prepare for entry into appropriate industry related occupations and develop a base for further occupational education."

The students educational level prior to enrolling in this course is a tenth grade education or equivalent. The course is divided into three units. These are:

Unit one:

1. Principles of front end alignment.
2. Aligning front ends of various makes of automobiles.
3. Wheel balancing.
4. Removal and replacement of suspension system components.

Unit two:

1. Steering system principles.
2. Overhaul of manual and power steering gears and power steering pumps.
3. Removal and replacement of steering system components.

Unit three:

1. Brake system principles.
2. Operation of brake drum and rotor lathe.
3. Overhaul of power brake units.
4. Overhaul of entire braking system, both drum and disc types.

PROBLEM SOLVING ACTIVITIES

ABSTRACT: The problem solving activities designed and developed by The Industrial Education Instructional Materials Development Project at the University of Wisconsin-Stout, are based on creative thought. It is the intent of these activities to develop in each student an awareness of their creative problem solving abilities. Each activity is designed to utilize the experience that each student has had with related tools and materials thus minimizing any possible skill oriented barrier that may be encountered.

As an introduction, a brief descriptive story including the usefulness of the end product of each activity is included to acquaint the student with the relevancy of the activity.

A number of the elements of industry, as stated in the Guide, are consolidated in each separate problem solving activity.

If used to their fullness, each of the problem solving activities can be developed from the research and development stage thru to the marketing and distribution stage, resulting in an actual enterprise or mass production experience.

The problem solving activities developed by this project are:

LET'S MAKE A WALL HANGING

DESIGNING

LET'S CONSTRUCT A CATAPULT

THE ELECTRO-MAGNETIC CRANE

LET'S BUILD AN ELEVATOR

LET'S MAKE A HAND FISHING REEL

LET'S DESIGN A RECREATIONAL GAME

LET'S MAKE A YO-YO

LET'S MAKE A KITE

THE CLEANING AND LUBRICATION OF ELECTRIC MOTORS

REPAIR OF A LAMP CORD AND SOCKET

LAB MAINTENANCE PLAN DEVELOPMENT

EXAMPLE ELEMENTARY UNIT

ABSTRACT: A study of our culture and the industrial society in which we live should be included in all aspects of our educational systems. The following materials have therefore been designed to aid in the development and implementation of industrial education curricula at the elementary school level. The activities contained herein are not skill directed, but instead, are intended to develop within the elementary student a basic awareness of our industrial society. This exemplary material was developed to help stimulate thinking and create new ideas for the elementary school teacher so new materials and activities may be developed which will enhance the educational explorations of our students.

The contents of this unit are based upon the concept of construction. Included in the unit are areas on house construction recognition, construction time, occupations, materials, and tools.

EXAMPLES OF SUB-OBJECTIVES AND LEARNING TASKS APPROPRIATED TO FIELD OBJECTIVES STATED IN THE GUIDE

ABSTRACT: A task analysis designed as a creative thinking aid to teachers for curriculum development to implement The Wisconsin Guide to Local Curriculum Improvement In Industrial Education, K-12.

A number of the objectives from the Guide are included with examples of supporting activities and learning tasks for implementing the content and structure of the Guide into local industrial education programs. Example tasks and activities are provided for elementary, middle school, and high school industrial education teachers.

APPENDIX C

Educator's Evaluation of Materials Developed to Implement the Guide Survey

UNIVERSITY OF WISCONSIN-STOUT
MENOMONIE, WISCONSIN
54751

EDUCATOR'S EVALUATION OF
MATERIALS DEVELOPED TO IMPLEMENT THE GUIDE

This questionnaire is aimed at determining the value of the materials prepared as an aid in implementing the content of The Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12. We would like to have your reactions so we can revise these materials where needed. Circle the one response which most nearly describes your opinion of each statement. An example is provided:

Key: SA - Strongly Agree
A - Agree
U - Uncertain
D - Disagree
SD - Strongly Disagree

Example: SA (A) U D SD

I feel that all boys at the junior high level should be required to enroll in industrial arts classes.

This response indicates that the individual agrees with the item stated. Please complete the questionnaire.

SA A U D SD 1. The student will frequently use the technical knowledge and skills he has developed while studying this lesson.

SA A U D SD 2. The package provided sufficient activities for the student.

SA A U D SD 3. Student interaction was provided for through the use of this package.

SA A U D SD 4. The package provided a realistic approach for the student to obtain education for a future position in our society.

SA A U D SD 5. Instruction provided in this material was always related to achievement of my course objectives.

SA A U D SD 6. Content provided in this package was usually up-to-date.

SA A U D SD 7. Instruction in this package was usually geared toward the individual and his needs, rather than the class as a whole.

SA A U D SD 8. The instructional material covered a wide enough spectrum to meet the educational needs of all my students.

SA A U D SD 9. Content of this package was never duplicative of materials previously learned by the student at lower levels of education.

SA A U D SD 10. All junior high students should be required to study the materials presented in this package.

SA A U D SD 11. This package has no place in the curriculum of my industrial education program.

SA A U D SD 12. The teaching of this package did not require me to develop any additional skills and strategies.

SA A U D SD 13. Other industrial education technical instruction would have been more relevant to the needs of the majority of my students.

SA A U D SD 14. The package provided an excellent source for my students to explore career possibilities.

SA A U D SD 15. The package contributes effectively toward understanding by my students of the concept of how industry functions in producing goods and services.

Open Ended Question:

In the space below, list suggestions for revision of this package.

Name:

School:

Package Evaluating:

Grade Level:

APPENDIX D

Field Testing Inquiry Letter

Letter to Teachers in the Field

February 20, 1974

Recently the Department of Public Instruction published and distributed its new Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12. At this time a research project is underway at the University of Wisconsin-Stout. Its intentions are to develop instructional materials which will show how the Guide can be implemented by the classroom teacher.

Presently the project has approximately twenty learning activity packages developed which contain activities, information and illustrations. These materials are student directed individualized packages, but they can easily be used for teacher directed instruction. In our attempts to develop meaningful examples of ways to implement the Guide into any existing industrial education program, we have tried to provide example instruction covering all the eleven elements of industry and five field objectives of the Guide.

In talking with of the Stout faculty, he recommended your name as one of the more able teachers in the field who would be looking for new ideas to implement into your present industrial education program. We thought that you might be interested in helping with our field testing of these materials. Enclosed is a questionnaire which will help us in selecting the materials which would most likely blend into your program. It will also provide us with information for contacting you for further discussion of the above proposal.

Please return your questionnaire in the enclosed envelope as soon as possible since the school year is quickly drawing to a close. We are planning to conduct our field testing from March 18 to April 19, 1974. If you need any further information, please call me at 715/232-2365.

Thank you for your time and consideration. We are anticipating your next correspondence.

Sincerely yours,

John M. Ritz, Project Coordinator
Implementing the Wisconsin Guide
to Improvement in Industrial Education